

Notes

Notes on the biology of *Brephidium exilis* (Boisduval) (Lycaenidae)

Brephidium exilis (Boisduval) is a common butterfly throughout much of the western United States, where its distribution stretches as far north as Oregon. Since Edwards (1894, Can. Ent. 26: 37–38), several authors (Coolidge, 1924, Ent. News 35: 115–121; Shapiro, 1972, J. Lepid. Soc. 27(2): 157–158 and Johnson, 1984, J. Res. Lepid. 23: 104–106) offers data concerning aspects related to its host plant and behavior.

In September and October of 1985 I studied some aspects of the biology of this species on the U. C. Davis campus. Around Davis, Yolo Co., California, *B. exilis* forms populations considered colonizing or fugitive (Shapiro, 1980, Atala 8(2): 46–49). In this locality I have seen this species often flying around *Bassia hyssopifolia* (Pallas) Volk., *Suaeda fruticosa* (L.) Forsk., *Atriplex argentea* Nutt. ssp. *expansa* (Wats) Hall & Clem. and *Salsola australis* R. Br. (all Chenopodiaceae) and *Amaranthus graecizans* L. (Amaranthaceae). In this paper some aspects of the biology of this species in a colony which was flying around *S. australis* and *A. graecizans* are described. Both plants were growing on waste ground. *S. australis* grew in a semispherical fashion, reaching a height of about 1 m with some 60 individual plants spread over a distance of 100 m between the two furthest apart. *A. graecizans*, on the other hand, is a creeping plant. In the study area its distribution and abundance are similar to the latter. Both are annual and reach maximum development during late summer and early autumn.

In September, *S. australis* is in full flower. *B. exilis* flies preferentially around the bushes of this species, upon which courting, mating and egg-laying are carried out. The light bluish-green eggs are laid near the flowers of *S. australis*. For this purpose the female walks up and down the branches and after trying out different flowers, lays just one egg close to one of them, flying off then to search for another place to lay the next egg. Oviposition occurs also on *A. graecizans*, although egg-laying on this foodplant is less frequent.

In spite of their abundance, the caterpillars are difficult to find on the food plant. On *S. australis* they feed on the flowers introducing the forepart of their body into the axils of the bracteol which supports the flower. The *B. exilis* caterpillars frequently attract ants. *Conomyrma insana* Buckley (Formicidae: Dolychoderinae) is often found around them and occasionally several specimens around the same caterpillar. Due to the crypsis of the caterpillars on the food plant, the best way to locate them is to follow the ants which attend them. *C. insana* may play an important role in protecting the caterpillars from fly parasitization. It has been observed that when a larva is approached by the fly *Aplomia theclarum* Scudder (Tachinidae), attendant ants become very agitated, forcing the tachinid to fly off again. Similar behavior has been reported by Coolidge (1924, loc. cit.). Nevertheless a large number of caterpillars collected in the field and reared in the laboratory contained the parasitoid larva, which emerges in the last larval instar. The fly's pupal stadium lasts about 12 days.

With the first autumn rainfalls the population of *B. exilis* decreases rapidly. According to Coolidge (1924, loc. cit.) hibernation takes place as pupa. Shapiro

(pers. comm.) states that no live pupa have been found near Davis after Christmas, and that the species resumes flight in late Spring (April to June in different years), suggesting annual reimmigration.

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Courtship of a model (*Adelpha*; Nymphalidae) by its probable Batesian mimic (*Limenitis*; Nymphalidae)

Silberglied (1977, in *How Animals Communicate*, T. Sebeok, ed., Indiana Univ. Press, Bloomington, Indiana) suggested that optimal mating behaviors of organisms involved in mimicry associations should involve communication modes not shared by vertebrate predators. Because predation pressure causes natural selection for convergence in flight behaviors as well as gross wing pattern characteristics between mimics and their models, behaviors associated with species recognition during courtship are expected to not rely heavily on visual cues whether the species involved is a model or a mimic.

Observations on interspecific courtships allow insights concerning which traits are important for mate recognition within species. Shapiro (1985, *J. Res. Lep.* 24: 79–80) reported a case of confounded courtship where in the male of a presumed model species (*Erynnis propertius* Scud. & Burg., Hesperidae) pursued a female mimic (*Euclidea ardita* Franc.; Noctuidae). Contrary to the prediction above, the male appeared to be relying exclusively on visual cues. In the following case the sexes are reversed – the pursuing male is the mimic.

Adelpha bredowii californica (Butler) and its presumed Batesian mimic *Limenitis (Basilarchia) lorquini lorquini* (Boisduval) are sympatric below 2100 m. elevation throughout the Coast Ranges and Sierra Nevada in California. Both species are dark brown with a prominent creamy white band across both sets of wings and an orange tip on the forewing. These butterflies fly together in the same canyons, and males often compete for territories in the sunny patches of stream beds. The mimicry relationship has never been formally tested, but is widely inferred from both the sympatry and the documentation of Batesian mimicry in other species of *Limenitis* (e.g., Platt, Coppinger, & Brower, 1971, *Evolution* 25: 692–710).

While collecting *L. lorquini* and *A. b. californica* for laboratory studies, I encountered a male *lorquini* courting a female *b. californica*. The sighting occurred at 1355 hrs, 22 April 1986, in Mix Canyon, Solano Co., California (approx. 10 km. north of Vacaville), and lasted until 1359 hrs, when the pair was lost from sight. When initially encountered, the courtship was in progress, with both butterflies fluttering one to two meters above the road at the edge of a small sunlit area. After about thirty seconds, the female began flying faster,